

Alaska Energy Cost Reduction Program

Grantee: Alaska Power & Telephone Company

Project Name: Allakaket Power House Relocation

Authority Contract Number 169-05

Grant Project Completion Report

Background:

Alatna and Allakaket, with a combined population of approximately 220 people, is located 190 air miles northwest of Fairbanks, and 57 miles upriver from Hughes. The Koyukuk River separates the villages, with Alatna on the northern bank and Allakaket on the southern bank of the river. Access is by boat to both villages or by air to the Allakaket Airstrip. Air travel is frequently interrupted or cancelled because of weather. The climate of this area varies greatly from 70 degrees Fahrenheit in the summer to -75 degrees Fahrenheit during winter. The annual snowfall is 72" with 12" annual rainfall. Because of the dangers of flowing ice chunks and thin shelf ice, travel between the two villages is cut off for a couple of months in the late fall and late spring while the Koyukuk River freezes and thaws, with the river generally frozen over from November through May. All of the houses and community facilities are dependent on the Alaska Power & Telephone (AP&T) powerhouse in Allakaket with an underground 35kV power line crossing the Koyukuk River. There is a small backup generator in Alatna, however, the logistics and costs of transporting fuel between the villages makes operating the Alatna plant cost-prohibitive.

Every year the Koyukuk River breakups and flooding whittled away the river bank, drawing closer to the village, and more importantly the existing power plant. The huge, new channel cut in during the spring of 2004 breakup escalated the importance of relocating the power plant further inland. After surviving previous flooding, the existing power plant showed structurally deterioration with rotting floor joists failing to support the generator's weight, and serious sag of the second story floor. Temporarily repairs of timbers set on floor jacks in the crawlspace helped stabilize the structure. The building entry deterioration constituted a workplace safety hazard.

The final point of contention for the Allakaket power house was fuel spill potential and environmental impacts due to the transfer system. Fuel transfers entailed hauling a 3,000 gallon wagon mounted tank attached from the fuel storage area at the airport to the power house. The wagon and front-end loader tow vehicle constituted huge risk for AP&T, the environment, and the city of Allakaket.

With growth of new infrastructures in both Allakaket and Alatna, such the city's well with approximately 1,400' of heat tapes, electrical demand supplanted AP&T generation capacity. The new water plant and washeretia in Alatna could start operation due to the lack of electric capacity.

Activities

After funding was secured, power plant construction was placed on hold land transfer between the federal government, the K'oyitl'ots'ina, Ltd. (KCorp) tribe and the City of Allakaket. In June 2005, AP&T could finally begin construction on Lot 1 this land.

During the construction delay, AP&T pursued gravel rights from the abandoned airstrip by the Koyukuk River. When the Bureau of Land Management and Federal Department of Transportation refused gravel to AP&T, a new search secured foundation gravel near Alatna and transported it across an ice bridge on the Koyukuk River. Engineering firms provided proper pad and foundation construction methods in permafrost. The resulting pad was built with 42' thermo-siphon condensers, insulating board at varying depths, fuel vapor barriers, Bentomat blanket over the pad, and foot compacted of silt/gravel mixture.

Local hire construction staff had pad construction completed August 19, 2006. AP&T power generation personnel installed six new power plant modules and completed connections the fuel line to the bulk fuel tank farm. Staff linemen installed the new step-up bank pole and three-phase bank, upgraded the existing single-phase power line to three-phase, and connected to the power plant. Telephone staff installed communication lines to the power plant allowing installation of the meter system.

The final construction steps covered the modules and parking area with a roof then thoroughly insulated. With the onset of winter, wind funneling snow into the open "U" of the complex necessitated building sliding doors to make a tight enclosure.

At 3:23 PM, September 29, 2006, the new power plant's three 175kw generators went on line supplying both villages with power. The new power system has capacity for the electrical needs of future community growth. The old powerhouse was taken out-of-service.

Project Cost:

AEA Grant	\$20,175
Denali Grant	\$1,181,999
Alaska Power & Telephone	\$549,645
Total Project Budget	<u>\$1,781,819</u>
Labor Costs	\$467,095
Direct Materials	\$710,484
Other Materials	\$362,652
Vehicle Costs	\$3,222
General & Admin Costs	\$208,366
Total Project Cost	<u>\$1,751,819</u>

Problems Encountered:

The project suffered many setbacks:

- The 14c federal land transfer to K Corp took years instead of the anticipated months.

- Obtaining gravel for pad construction required substantially more work than planned.
- The dilapidated Allakaket City construction equipment needed constant repair and maintenance.
- Rental equipment was sabotaged.
- Early pad samples conducted by contracted engineers determined more silt needed to be added to the mix to be sure the pad would freeze required rebuilding the pad.
- With only one plane available capable of carrying construction materials, transportation slowed necessary materials during construction.
- Weather further hampered flying materials and crew.
- The bulk fuel line from the bulk fuel tank farm, built previously for the washeteria, was contaminated with rocks, sand, and debris.
- The automated meter system would not work with the new power plant. The manufacturer is reconfiguring the system to make it compatible

Project Outcomes:

The new power plant meets all current codes and regulations while handling both villages' electrical needs alleviating past overload issues. New SCADA capabilities, the capability to start up a dead plant or change generators via phone lines, will be advantageous, especially when inclement weather delays flights into the village.

Conclusions and Recommendations:

Overall the new power plant works well providing more than enough electric power to both villages for many years to come. With the power plant connected to the bulk fuel tank farm, the risks associated with moving fuel by tank-trailer former have been eliminated.